

## TO-220F-B Plastic-Encapsulate Diode

HYPERFAST RECTIFIER,FRED

### MAIN CHARACTERISTICS

|              |                      |
|--------------|----------------------|
| $I_o$        | 30(15×2)A            |
| $V_{RRM}$    | 400V                 |
| $T_{rr}$     | 23ns                 |
| $T_j$        | 175℃                 |
| $V_{F(typ)}$ | 0.88V(@ $T_j=150℃$ ) |

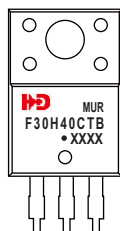
### FEATURES

- Ultrafast Recovery Times and Low Recovery Loss
- Low Forward Voltage
- Low Reverse Leakage Current

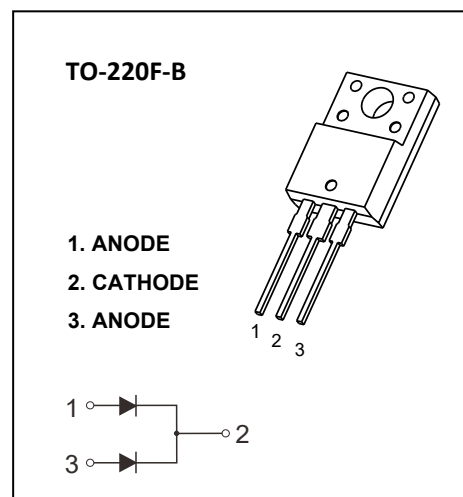
### APPLICATIONS

Specifically designed to improve efficiency of PFC and output rectification stages of EV / HEV battery charging stations, booster stage of solar inverters and UPS applications, these devices are perfectly matched to operate with MOSFETs or high speed IGBTs.

### MARKING



MURF30H40CTB = Device code  
Solid dot = Green molding compound device  
if none, the normal device  
XXXX = Code



### MAXIMUM RATINGS ( $T_c=25℃$ unless otherwise noted )

| Symbol          | Parameter                                                    | MURF30H40CTB | Unit |
|-----------------|--------------------------------------------------------------|--------------|------|
| $V_{RRM}$       | Peak Repetitive Reverse Voltage                              | 400          | V    |
| $V_R$           | DC Blocking Voltage                                          |              |      |
| $I_{F(AV)}$     | Average rectified output current@ Per leg( $T_c=124℃$ )      | 15           | A    |
|                 | Average rectified output current@ Total device( $T_c=124℃$ ) | 30           |      |
| $I_{F(RMS)}$    | RMS Forward Current( $T_c=124℃$ )                            | 21           | A    |
| $I_{FSM}$       | Non-Repetitive Surge Forward Current (8.3ms )                | 250          | A    |
| $P_D$           | Power dissipation                                            | 33           | W    |
| $R_{\theta JC}$ | Thermal Resistance From Junction to Case@ Per leg            | 4.5          | ℃/W  |
| $T_j$           | Operating Junction Temperature Range                         | -55 ~ +175   | ℃    |
| $T_{stg}$       | Storage Temperature Range                                    | -55 ~ +175   | ℃    |

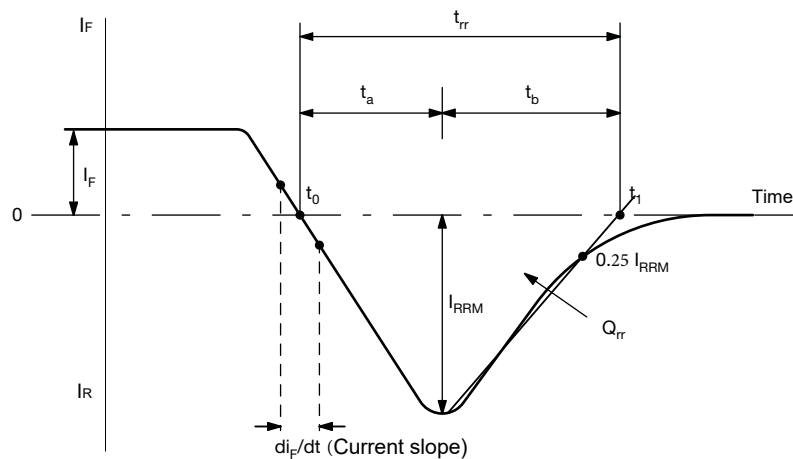
## Typical Characteristics

### ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ unless otherwise specified)

| Symbol     | Parameter             | Test Conditions                                                    | Min. | Typ. | Max. | Unit          |
|------------|-----------------------|--------------------------------------------------------------------|------|------|------|---------------|
| $V_{(BR)}$ | Reverse Voltage       | $I_R=100\mu\text{A}$                                               | 400  |      |      | V             |
| $I_R$      | Reverse Current       | $V_R=400\text{V}$                                                  |      |      | 5.0  | $\mu\text{A}$ |
|            |                       |                                                                    |      |      | 500  | $\mu\text{A}$ |
| $V_F$      | Forward Voltage       | $I_F=15\text{A}$                                                   |      | 1.1  | 1.4  | V             |
|            |                       |                                                                    |      | 0.88 |      | V             |
| $C_{tot}$  | Total Capacitance     | $V_R=200\text{V}, f=1\text{MHz}$                                   |      | 28.4 |      | pF            |
| $t_{rr}$   | Reverse Recovery time | $I_F=0.5\text{A}, I_R=1\text{A}, I_{rr}=0.25\text{A}$              |      | 26   |      | ns            |
|            |                       | $I_F=1\text{A}, V_R=30\text{V}, di_F/dt = 200\text{A}/\mu\text{s}$ |      | 23   |      | ns            |

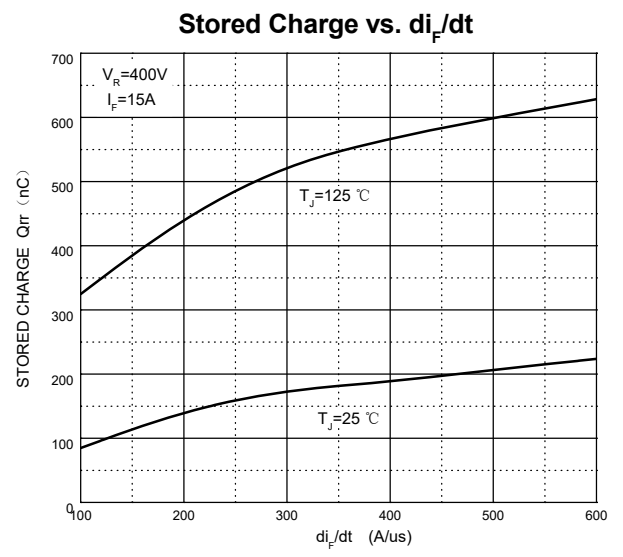
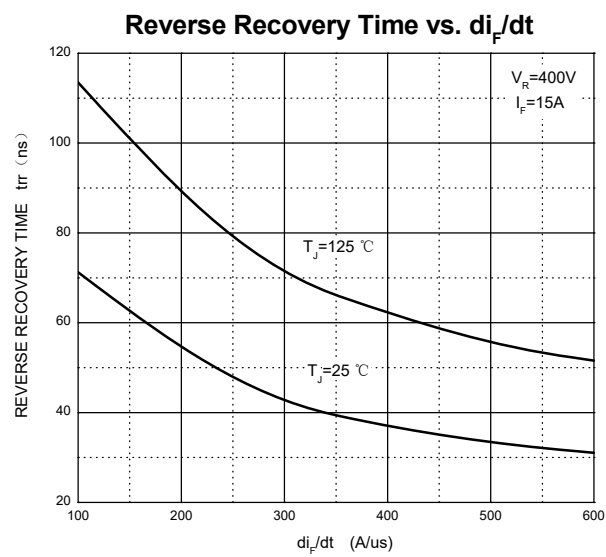
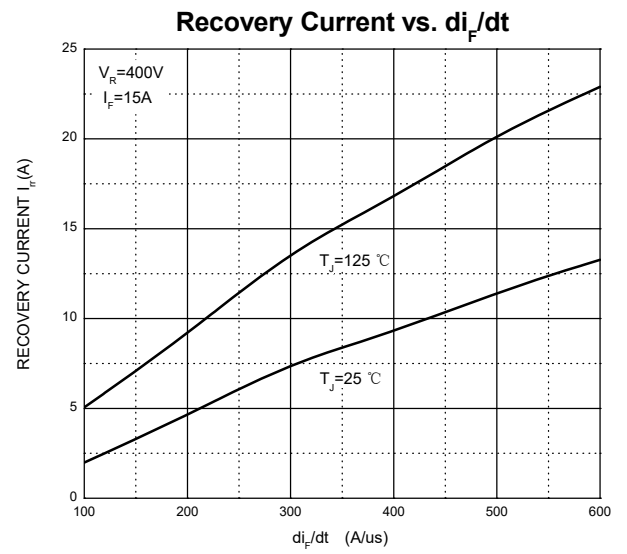
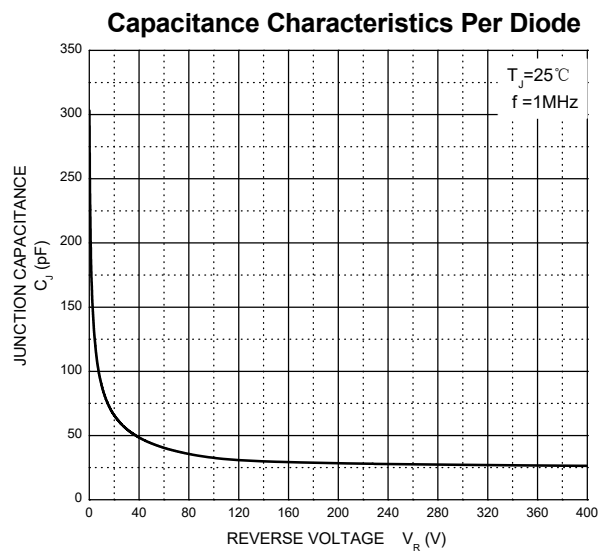
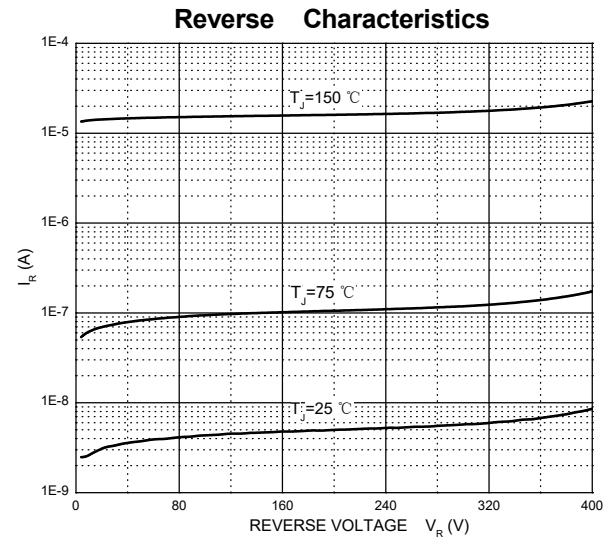
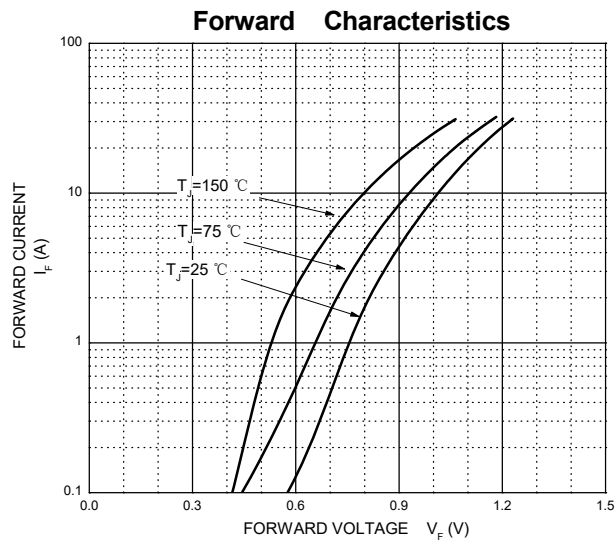
### ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ unless otherwise specified)

| Symbol    | Parameter                     | Test Conditions                                                                           | Min. | Typ. | Max. | Unit |
|-----------|-------------------------------|-------------------------------------------------------------------------------------------|------|------|------|------|
| $t_{rr}$  | Reverse Recovery Time         | $I_F=15\text{A}, V_R=200\text{V}, di_F/dt=200\text{A}/\mu\text{s}$                        |      | 53.9 |      | ns   |
| $I_{RRM}$ | Max. Reverse Recovery Current |                                                                                           |      | 4.6  |      | A    |
| $Q_{rr}$  | Reverse Recovery Charge       |                                                                                           |      | 144  |      | nC   |
| $t_{rr}$  | Reverse Recovery Time         | $I_F=15\text{A}, V_R=200\text{V}, di_F/dt=200\text{A}/\mu\text{s}, T_J=125^\circ\text{C}$ |      | 88.3 |      | ns   |
| $I_{RRM}$ | Max. Reverse Recovery Current |                                                                                           |      | 9.1  |      | A    |
| $Q_{rr}$  | Reverse Recovery Charge       |                                                                                           |      | 446  |      | nC   |
| $t_{rr}$  | Reverse Recovery Time         | $I_F=15\text{A}, V_R=200\text{V}, di_F/dt=600\text{A}/\mu\text{s}, T_J=125^\circ\text{C}$ |      | 51.6 |      | ns   |
| $I_{RRM}$ | Max. Reverse Recovery Current |                                                                                           |      | 22.9 |      | A    |
| $Q_{rr}$  | Reverse Recovery Charge       |                                                                                           |      | 628  |      | nC   |



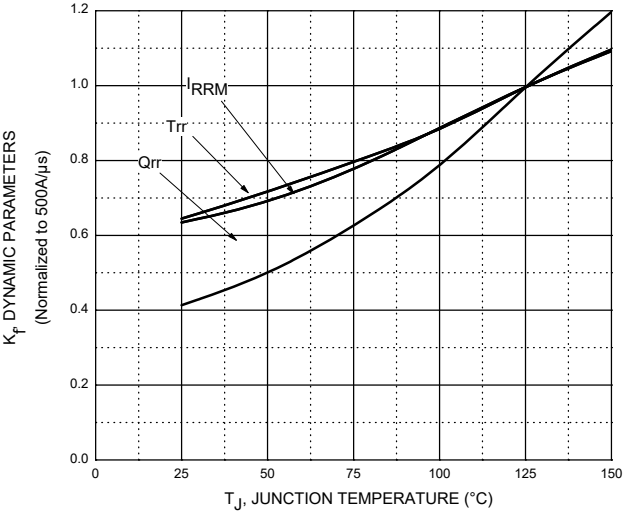
Reverse Recovery Waveform and Definitions

# Typical Characteristics

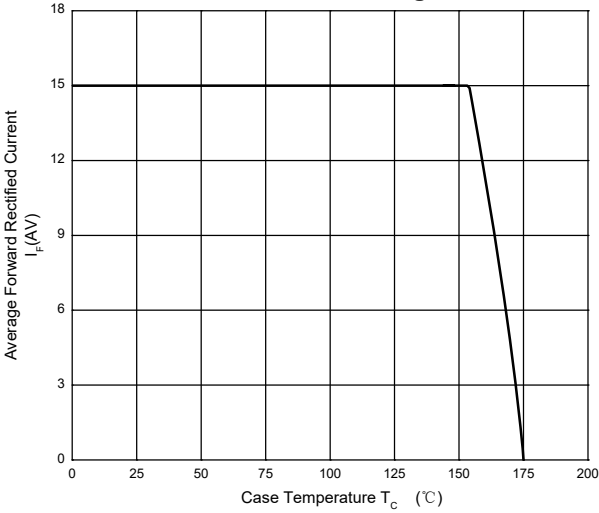


# Typical Characteristics

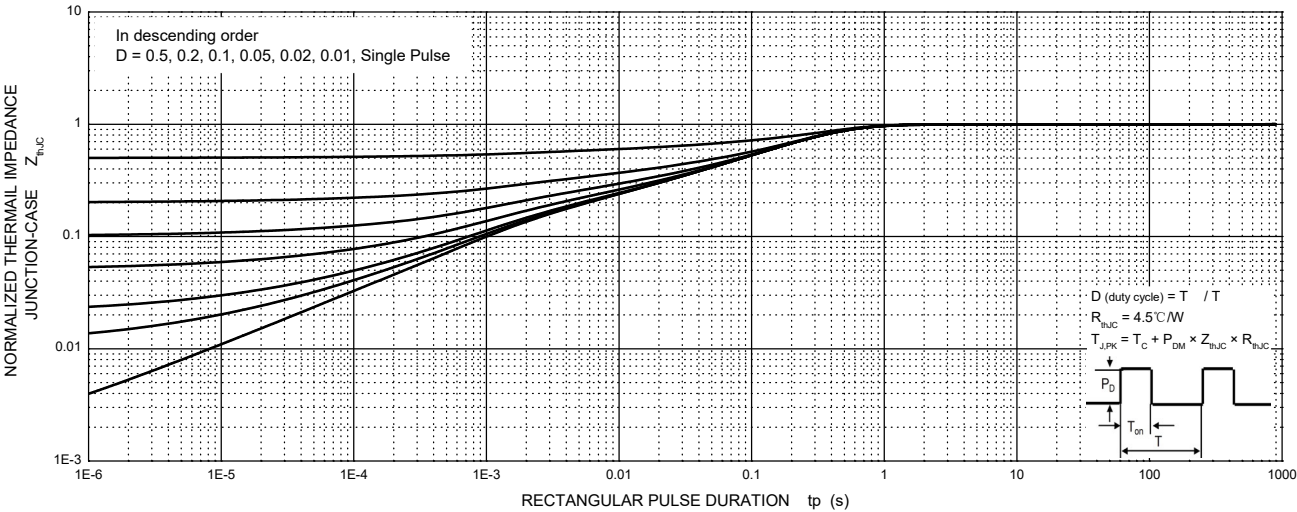
Dynamic Parameters vs. Junction Temperature



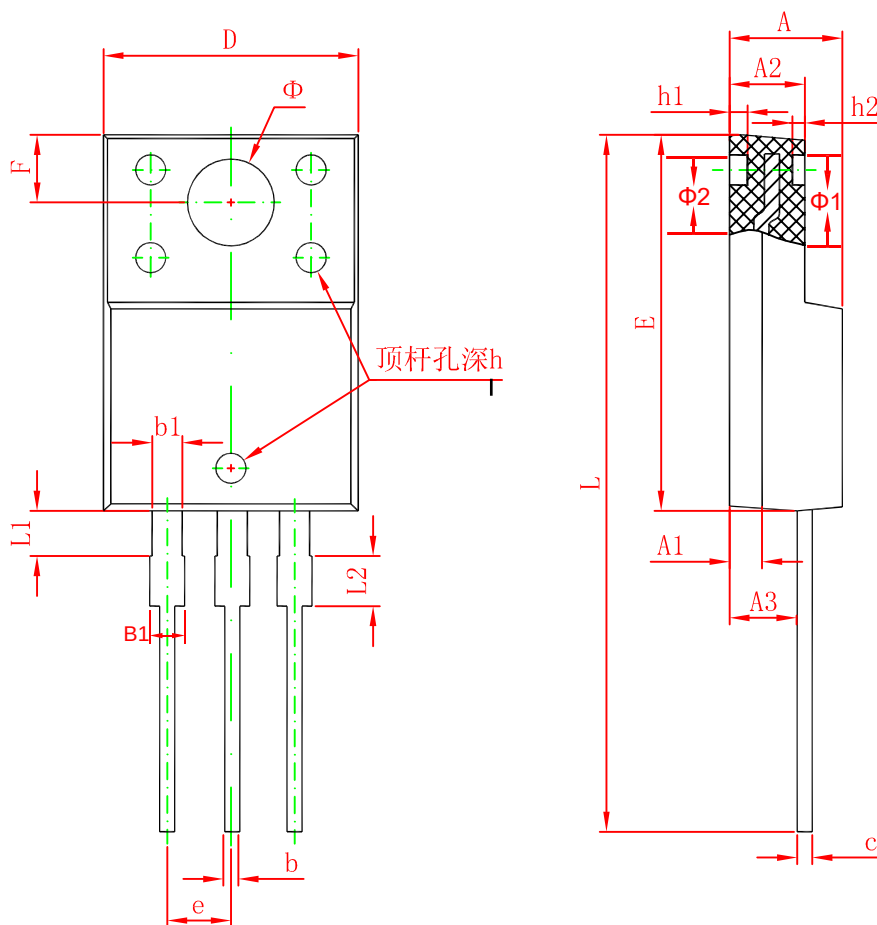
Current Derating



MURF30H40CTB Transient Thermal Impedance, Junction-Case



## TO-220F-B Package Outline Dimensions



| Symbol   | Dimensions In Millimeters |        | Dimensions In Inches |       |
|----------|---------------------------|--------|----------------------|-------|
|          | Min.                      | Max.   | Min.                 | Max.  |
| A        | 4.300                     | 4.700  | 0.169                | 0.185 |
| A1       | 1.200 REF.                |        | 0.047 REF.           |       |
| A2       | 2.800                     | 3.200  | 0.110                | 0.126 |
| A3       | 2.500                     | 2.900  | 0.098                | 0.114 |
| b        | 0.710                     | 0.910  | 0.028                | 0.036 |
| b1       | 1.100                     | 1.350  | 0.043                | 0.053 |
| B1       | 1.150                     | 1.400  | 0.045                | 0.055 |
| c        | 0.500                     | 0.750  | 0.020                | 0.030 |
| D        | 9.960                     | 10.360 | 0.392                | 0.408 |
| E        | 14.800                    | 15.200 | 0.583                | 0.598 |
| e        | 2.540 TYP.                |        | 0.100 TYP.           |       |
| F        | 2.700 REF.                |        | 0.106 REF.           |       |
| $\Phi$ 1 | 3.300                     | 3.700  | 0.130                | 0.146 |
| $\Phi$ 2 | 3.000                     | 3.400  | 0.118                | 0.126 |
| h        | 0.000                     | 0.300  | 0.000                | 0.012 |
| h1       | 0.800 REF.                |        | 0.031 REF.           |       |
| h2       | 0.500 REF.                |        | 0.020 REF.           |       |
| L        | 28.000                    | 28.400 | 1.102                | 1.118 |
| L1       | 2.100                     | 2.400  | 0.082                | 0.094 |
| L2       | 1.300                     | 1.700  | 0.051                | 0.066 |